

UNITED STATES PUBLIC HEALTH SERVICE

RUPERT BLUE, SURGEON GENERAL

SCARLET FEVER

ITS PREVENTION AND CONTROL

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SCARLET FEVER.

Scarlet fever is regarded, by the informed, as one of the dreaded diseases of childhood, not only because an attack may be so malignant as to cause death in a short time, but also because of its high degree of infectiousness, the many and grave complications with which it may be attended, and because the hope of recovery, even in cases apparently mild at the outset, has proved too often illusory.

As we are as yet without specific remedies against scarlet fever, our reliance for its mastery must lie in its prevention. This pamphlet is therefore addressed to the general public, whose intelligent cooperation is necessary in all preventive measures against diseases, in the hope that it will aid, in some small degree, in spreading that knowledge of communicable diseases which should be in the possession of every citizen to enable him to do his share in their prevention.

Occurrence of scarlet fever.—Scarlet fever is more especially a disease of temperate climates. In Europe it is more generally prevalent in England and Germany, in which countries it is always present and frequently epidemic. In the United States it affects particularly the Northern States, being more prevalent there than in the South. It is also a city rather than a rural disease, some two-thirds of all the deaths from scarlet fever in the registration area of the United States, in 1912, having occurred in cities. (About 46 per cent of the population of the United States live in cities.)

Scarlet fever and season.—Scarlet fever prevails during the colder months of the year. With the opening of the schools, the autumn months are always signalized by the marked increase in the number of cases of scarlet fever reported to health offices, each month showing a progressive increase until a maximum is reached in December and January. Only a small decline in the number of reported cases is shown in the spring months, but in July and August there is a great falling off, the number of cases reported being very much less than in the winter months.

The chart on page 4 gives an excellent idea of the seasonal variations in the number of cases of scarlet fever reported to the Boston city health office.

Age and scarlet fever.—While scarlet fever may attack persons of any age, not even the very old being exempt, it is primarily a disease of infancy and childhood. The susceptibility to the disease becomes rapidly less with increasing years. From the figures for 1912, published by the Bureau of the Census, over 55 per cent of the total deaths from scarlet fever in the registration area of the United States took place in children less than 5 years old, over 83 per cent in children less than 10, over 90 per cent in children less than 15, and over 96 per cent in persons less than 25 years of age.

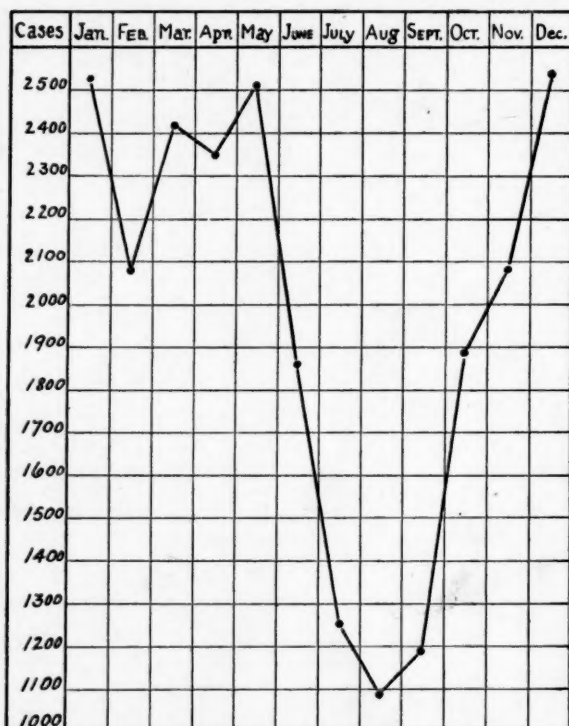


FIG. 1.—Cases of scarlet fever reported to the Boston Board of Health from 1890 to 1904, by months. (After McCollom and Place, *Modern Medicine*, 2d ed., v. 1, p. 858.)

On the other hand, very young infants do not seem very susceptible to contracting scarlet fever. The disease is seldom seen in infants less than 7 months old. The disease, however, is very fatal to infants if they are attacked. The greatest susceptibility to scarlet fever falls between the second and the ninth year, over 60 per cent of the deaths from scarlet fever taking place in this age period.

The fatality of scarlet fever.—The virulence of scarlet fever is variable. In epidemics the percentage of those stricken by the disease who die varies from 1 to 15.

Age is an important factor, the rule being that the younger the patient the more fatal the disease. The chart on page 6 shows the percentage of fatal cases, by age, in 5,000 cases of scarlet fever treated in hospital.¹

It will be seen from this table that in children under 1 year old the mortality was 33 per cent; from 5 to 6 years old the mortality was 6 per cent. The lowest rate was found in children from 13 to 14 years of age.

The cause of scarlet fever.—We are still ignorant of the specific germ which causes scarlet fever. We do find, however, that infection with the scarlet-fever germ is, in the great majority of instances, accompanied by infection with certain pus germs (streptococci). The virus of scarlet fever when it enters the body seems to weaken its natural resistance to the pus germs which are always present upon the skin and in the mouth, nose, and throat, so that these seize the opportunity to invade the system, the defenses of which have been sapped by the action of the scarlatinal virus. Most of the complications of scarlet fever are due to the action of these pus germs.

Vitality of the scarlet-fever germ.—The scarlet-fever germ displays great tenacity of life. It seems to cling to whatever objects it encounters. In no other disease has the infection been apparently conveyed with such frequency by objects which have come in contact with those ill from scarlet fever, such as clothes, books, toys, and the like.

The virus is readily destroyed by heat; with less readiness by disinfectant solutions.

The symptoms of scarlet fever.—Some description of the symptoms of scarlet fever is desirable so that all may be on their guard against the disease. Its principal symptoms consist in sore throat, fever, rapid pulse, the breaking out of a bright red rash (from which it

¹ Most of the statements contained in medical literature regarding the fatality rate of scarlet fever—and the same applies to other diseases—have been based upon hospital and institutional experience. The fatality rates given have been in many instances higher than the rates existing outside of institutions. To ascertain the fatality rate of scarlet fever in general we are obliged to compare the number of cases reported in a community with the number of deaths registered as due to the same cause.

During the calendar year 1912 there were reported in Massachusetts 5,633 cases of scarlet fever, with 118 deaths, giving a fatality rate of 2.09 per cent; in Utah 1,024 cases, with 18 deaths, giving a fatality rate of 1.75 per cent; in Maryland 608 cases, with 11 deaths, giving a fatality rate of 1.8 per cent; in San Francisco 192 cases, with 1 death, giving a fatality rate of 0.52 per cent; in Los Angeles 450 cases, with 6 deaths, giving a fatality rate of 1.33 per cent; in Washington, D. C., 259 cases, with 4 deaths, giving a fatality rate of 1.54 per cent; in Boston 1,153 cases, with 32 deaths, giving a fatality rate of 2.78 per cent.

In 1913 there were reported in Utah 1,020 cases, with 15 deaths, giving a fatality rate of 1.47 per cent; in Maryland 822 cases, with 23 deaths, giving a fatality rate of 2.8 per cent; in Kansas 1,497 cases, with 37 deaths, giving a fatality rate of 2.47 per cent; in San Francisco 305 cases, with 16 deaths, giving a fatality rate of 5.25 per cent; Los Angeles 396 cases, with 11 deaths, giving a fatality rate of 2.78 per cent; Washington, D. C., 556 cases, with 13 deaths, giving a fatality rate of 2.34 per cent; Boston 1,900 cases, with 77 deaths, giving a fatality rate of 4.05 per cent.—Editor.

takes its name) over the body and extremities, and usually swelling and tenderness of the glands of the neck. These symptoms are followed by a stage known as the period of desquamation, or peeling, during which the outer layers of the skin are shed in scales, flakes, or patches.

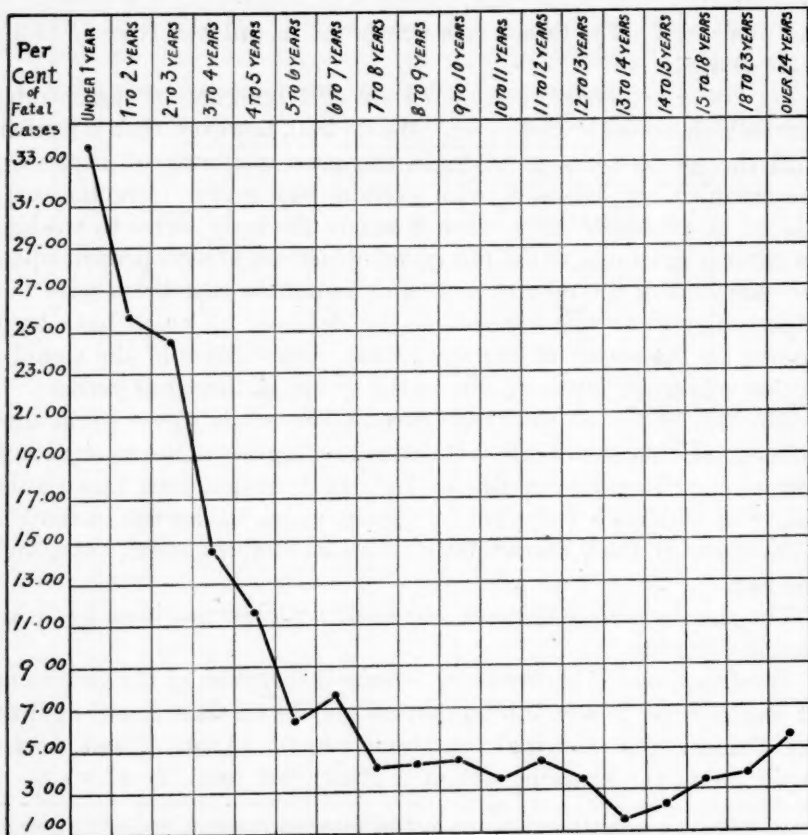


FIG. 2.—Percentage of fatality according to age in 5,000 hospital cases. (After McCollom and Place, *Modern Medicine*, 2d ed., v. 1, p. 888.)

We can distinguish three well-marked stages in the course of an attack of scarlet fever:

1. The period of invasion.
2. The period of eruption.
3. The period of desquamation.

Period of invasion.—The disease strikes suddenly. A child, hitherto apparently in the best health, is seized with sore throat and fever, very often with vomiting, and, in infants, convulsions. The fever mounts rapidly, the skin feels unusually hot and dry to the touch, the tongue is furred, the throat parched, the face flushed and

somewhat bloated. Cough and running of the nose are unusual. This stage usually last 24 to 36 hours.

Stage of eruption.—The rash usually appears on the second day, but may be deferred for 48 hours. On the other hand, it may begin to come out a few hours after the first symptoms. It appears first on the neck and chest as a breaking out of fine, scattered, bright points implanted on a scarlet flush. It spreads rapidly, so that by the evening of the second day the entire body may be covered. The eruption at its height has a vivid scarlet hue quite unlike that seen in any other eruptive disease. The rash is more marked on the inner surfaces of the arms and legs and where joints make folds of the skin, as in the groins and at the elbows.

In some cases the rash is patchy instead of uniform, with islands of normal skin. At other times tiny elevated patches appear, as in measles, but this is not so common as in the latter disease.

In malignant attacks bleeding may take place in the skin, causing large purplish patches.

After persisting at its height for two or three days the rash gradually fades, the fading being accompanied by a progressive fall of the fever.

Period of desquamation or peeling.—With the fading of the eruption and the fall of the fever the skin looks stained and feels rough. Gradually its outer layers begin to be thrown off, the process usually beginning about the neck and chest. The amount of peeling usually bears some relation to the previous intensity of the rash. When this has been vivid and its duration prolonged, large flakes and patches come away. Rarely the nails and hair are shed. On the other hand, with mild eruptions the peeling may be much less marked, consisting of bran-like particles only. The entire process lasts 10 to 20 days.

Throat symptoms.—Inflammation of the throat is a prominent symptom in scarlet fever. This is present in various grades and may vary from redness of the hard palate and inner surface of the cheeks, with some swelling and more vivid redness of the soft palate and tonsils, to the condition known as "diphtheroid," with much increased swelling and inflammation of the tonsils and neighboring parts, with extensive formation of a membrane over the tonsils and soft palate.

In these severe cases extensive membrane formation in the throat may lead to death of the underlying tissues, so that large sloughs form. The swelling of the glands and soft parts of the neck may be so extensive that breathing is interfered with and death ensues from suffocation, or deep abscesses form, endangering life and markedly prolonging convalescence.

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The tongue in scarlet fever.—The tongue in scarlet fever has a characteristic appearance. At the outset of the disease it is coated with white, the edges being red. The little papillæ or prominences with which the tongue is studded, emerge through the white coating and can be seen as little red points dotting the white surface.

Somewhat later in the disease the white coating disappears, leaving the tongue rough and red, often glazed. The papillæ remain considerably swollen, and this, together with the beefy appearance of the tongue, constitutes a condition characteristic of scarlet fever, which the writers describe as the "raspberry tongue." The breath in scarlet fever often has a peculiarly heavy, sweet odor.

Types of scarlet fever.—Scarlet fever shows marked variations in its severity. There are mild or abortive cases in which the rash is scarcely visible, or in which the sore throat and the "raspberry tongue" may be the only signs of the disease. In certain epidemics, particularly in schools, this type of the disease may constitute over a third of the cases.

On the other hand, the symptoms may be so severe that the patient, overwhelmed by the poison of the disease, may die within 24 to 36 hours, with high fever, great restlessness, delirium, and convulsions.

In other cases the throat symptoms are prominent and may be of the utmost severity. Rapid and thick membrane formation takes place which may extend into the interior of the nose, and into the ears through the Eustachian canals (openings of the ear into the throat). Death may ensue from suffocation, due to the swelling of the soft parts, or gangrene may set in, causing a fatal issue. Convalescence may be much delayed by persistent enlargement of the neck glands and the formation of deep abscesses in the neck, or by purulent discharges from the nose.

The complications of scarlet fever.—Scarlet fever is distinguished by the variety and severity of its complications, which may develop in cases apparently mild at the outset. The most common of these are inflammation of the kidneys (nephritis), ear complications (middle ear disease), inflammation of the lining membrane of the heart (endocarditis), inflammation of lymph glands (adenitis), and joint affections. Of these, nephritis and ear complications are by far the most common.

Inflammation of the kidneys (nephritis).—Inflammation of the kidneys may develop, usually in the second or third week of the disease, even in the mildest cases. The symptoms vary greatly in severity from instances in which the condition is shown only by the presence of albumen in the urine, pallor, and slight swelling of the eyelids and feet, to those of greater severity with scanty urine loaded with albumen and general swelling of the body, or to the

severe and rapidly fatal cases with scanty, bloody urine or urine completely suppressed, with vomiting, convulsions, and loss of consciousness.

There is evidence to the effect that an attack of scarlatinal nephritis, even if apparently recovered from, may predispose the individual later in life to develop chronic kidney disease.

Ear complications.—These are very common. They are caused by an extension of the throat inflammation to the interior of the ears through the canals by which they open into the throat. The inflammation may extend to the bony cells of the temporal bone behind the ear, causing mastoid disease; the hearing may be destroyed, or the inflammation may extend to the brain, causing dangerous brain complications. The ear complications of scarlet fever are a common cause of deafness.

Infectiousness of scarlet fever.—While highly infectious, it is indeed fortunate that scarlet fever does not show the very ready communicability of measles or whooping cough. Rather intimate contact with the sick seems to be required to transmit the disease. Observations have been made which allow us to estimate roughly the frequency with which persons, after exposure, contract the disease. These show that about 37 per cent of children sicken with scarlet fever after exposure, while in the case of measles about 99 per cent of those unprotected by a previous attack will take the disease under like conditions.

Period of incubation of scarlet fever.—While the average period of incubation of scarlet fever (i. e., the period between exposure and the appearance of symptoms) has been stated to be from 2 to 4 days, with a maximum of 7, the latest observations show that this period is very variable. The limits of the period of incubation are practically from 4 to 20 days, with an average of 10 to 14 days.

Portal of entry of the scarlet fever germ.—All the evidence tends to show that the mouth is the usual gateway through which the germ of scarlet fever enters the body.

How scarlet fever is "caught."—Each new case of scarlet fever is derived from some previous case of the disease. The scarlet fever germ is present in the discharges from the mouth, nose, and throat of the sick. The virus is also believed to be present, in the absence of proof to the contrary, in the flakes of skin shed during the peeling process. When there is a discharge from the ears, as a result of ear complications, this discharge also is infectious. This is true of other pus discharges, as from abscesses. The urine, too, in cases of scarlatinal nephritis, and matters vomited at the onset or during the course of the disease may contain the infecting agent of scarlet fever.

The disease is transmitted from those sick with scarlet fever to the well who come in contact with them because these discharges get

on the hands or mucous membranes of such persons. The infection is caused by direct contact, as by kissing, or by being sprayed with the infected nose and throat discharges, in the act of coughing, sneezing, or talking (droplet infection), or indirectly through various objects, such as drinking cups, candy, apples, pencils, pocket handkerchiefs, towels, and the like which have been placed in the mouth or infected with the discharges of those sick with scarlet fever.

It has often been pointed out that the chief factor in the spread of such diseases as scarlet fever and diphtheria is the freedom with which the fluids of the mouth are exchanged among human beings, especially among children. But little observation is needed to convince us of the frequency, during the day, with which the hands are carried to the mouth and then handle objects in common use. This tendency is, of course, greatest among children.

Duration of the communicability of scarlet fever.—Scarlet fever can be transmitted from the time of onset until the mucous membranes of the nose and throat are completely healed, a period sometimes lasting many weeks. All the evidence at hand tends to attach increasing importance to the discharges from mucous membranes and less to flakes of skin, shed during desquamation, as conveyers of scarlet-fever infection.

It must not be forgotten, however, that peeling of the skin is caused by its previous inflammation, which is paralleled by a similar process in the mucous membranes. We may assume roughly that it will take at least as long for the mucous membranes to regain their normal condition as it does the skin. As all the available evidence shows that the infectious agent of scarlet fever continues to be thrown off until the mucous membranes are completely healed, the necessity is obvious for regarding a patient as capable of transmitting scarlet fever, at least until desquamation is complete, and longer if a discharge or inflammation still persist in the nose, throat, or ears, or if an abscess be present. In general, it may be said that at least five to six weeks must elapse as a minimum before the patient can be considered free from the danger of transmitting the disease to others. This period must be extended as long as any evidence of an unhealed condition of the mucous membranes exists.

Scarlet-fever "carriers."—The spread of a number of communicable diseases is assisted by the agency of "carriers," i. e., apparently well persons who harbor in their bodies and spread the germs of a particular disease. The agency of "carriers" is important in disseminating such diseases as diphtheria, typhoid fever, cerebrospinal meningitis, cholera. While, in the absence of the knowledge of the specific germ which causes scarlet fever, there is no evidence to show that persons who have never had this disease can harbor its germs in their noses and throats, yet there is a very important class of scarlet-fever "carriers."

These consist of the "missed cases," viz, those persons who have suffered from scarlatinal sore throat alone, without eruption; who have not been sick enough to go to bed or, possibly, even complain of their symptoms, and the convalescent "carrier," the child, who, after an attack is allowed to mingle with his playmates too soon, or who continues to harbor the contagion in his nose and throat for a long time after apparent recovery. Such persons undoubtedly play an important part in spreading scarlet fever.

Milk-borne scarlet fever.—There are numerous records of outbreaks of scarlet fever in which the infection was conveyed by milk. These outbreaks were usually of an explosive character, an unusual proportion of adults were attacked, and the disease was often severe.

In every instance the source of the infection was shown to be due to the presence of persons suffering from scarlet fever, either on the dairy farm or among the persons engaged in handling the milk.

Immunity to subsequent attacks of scarlet fever.—The protection against future attacks conferred by a single attack of scarlet fever seems strong and lasting. Second and even third attacks of the disease have been observed. Relapses also, are occasionally noted, i. e., a child, apparently well upon the road to recovery sickens anew and goes through a second siege of the disease with all its attendant symptoms, including peeling.

Complication with other infectious diseases.—It must not be supposed that, because a person is suffering from scarlet fever he is thereby protected from having other communicable diseases at the same time. Scarlet fever has frequently been observed to be complicated with both measles and diphtheria.

Prevention of scarlet fever.—It is plain, from what has been said, that scarlet fever is no disease to be lightly held. To infants and young children it is a very fatal affection for which we have no specific remedy. Once contracted the disease must run its course. Yet, in spite of its communicability it is by no means a disease which "every child is bound to have sooner or later." The folly of the complacent attitude which permits the exposure of children to the diseases of childhood "so that they may have them over and done with" can not be too strongly condemned. If we succeed in protecting our children from scarlet fever during childhood, the chances that they will suffer from the disease later will be very greatly reduced. By so doing we will have protected them from what constitutes a very real menace to their lives, or to their subsequent physical efficiency.

The prevention of scarlet fever rests upon two foundation stones, the early recognition of the disease and the immediate isolation of the sufferer.

Diagnosis of scarlet fever.—While the responsibility for the diagnosis of scarlet fever must rest upon the attending physician, the

citizen can be of material assistance in limiting the spread of scarlet fever by being constantly alive to the possibility of outbreaks of the disease in his family. If a child be suddenly taken with vomiting and fever, or with dryness, tickling, or soreness of the throat, if soreness of the throat alone be complained of, or if any rash be discovered on the body in absence of other symptoms, no time should be lost in isolating the child and calling in a physician in order to ascertain the nature of the disorder as promptly as possible. It is the mingling of children sickening with a communicable disease with other children before its nature has been determined which helps to spread such diseases.

A great deal could be accomplished in the way of controlling the communicable diseases of childhood if it were the invariable rule in every household to isolate all children from other children as soon as they become ill until the nature of the sickness has been made out, especially when such illness is accompanied by sore throat, running nose, or huskiness of the voice.

The care of scarlet fever in the home.—The important principle to remember, in the care of scarlet fever, is that a child sick with scarlet fever who is carefully isolated does not transmit the disease.

The sick room.—The first rule, therefore, in the care of scarlet fever is to place the patient at once in a separate room. This room, if possible, should be on the story of the house the least in use, its adaptability for sick-room purposes being considered. All hangings, carpets, and upholstered furniture are to be taken from the room before the patient is brought in. The furniture left should be reduced to strict necessity and be of a kind readily cleansed.

There should be no such fancied attempts at purifying the air as by hanging up sheets wet with disinfectants. Such measures are not only useless but tend to give a false sense of security.

It is well to have a gas or kerosene stove in the room, so that water may readily be heated to boiling.

Separate linen, bedclothes, etc.—The patient should be provided with separate bedclothing, nightgowns, towels, eating utensils, and drinking vessels for his exclusive use. These should be kept rigidly separate from those used by the rest of the family. After use they are to be soaked for an hour or two in one of the disinfectant solutions given below, and then boiled for one-half hour in soapsuds. The clothes worn by the patient when taken sick should also be disinfected in the manner above described. Articles of wearing apparel which can not be so disinfected should be burned.

Attendant for the patient.—The patient should be provided with an attendant who remains with him and holds no communication with the other members of the family. This attendant should be the only person coming in contact with the patient apart from the attending physician.

Use of disinfectants.—A tub of good disinfectant solution should be provided for soaking articles used by the patient. A basin of disinfectant should also be at hand for cleansing the attendant's hands after handling the patient.

The following are proper disinfectant solutions:

1. Two per cent solution of phenol (carbolic acid).
2. Two per cent solution of liquor cresolis compositus, U. S. P. (compound solution of cresol).

A 2 per cent solution is made by adding 3 ounces (6 tablespoonfuls) of the disinfectant to 1 gallon of water. All surfaces soiled with discharges from scarlet-fever patients should at once be flooded with the disinfectant solution.

All articles used by the patient should be soaked for one to two hours in the disinfectant solution and then boiled for one-half hour in soapsuds. Discharges from the nose and throat of the patient are to be received into pieces of cotton gauze or old, clean squares of linen, which are then immediately placed, after use, into the solution of disinfectant. They are then burned. Partially eaten food is also disposed of by burning.

Care of the patient during peeling.—During desquamation the process is facilitated by rubbing the body with some bland unguent like olive oil or coco butter.

Care of the attendant's hands.—It is important to remember that the hands become readily infected when caring for scarlet-fever patients. Unnecessary handling of the patient, therefore, should be avoided. Whenever this is necessary the hands should be cleansed in disinfectant solution, and then in hot soapsuds.

Other precautions for the attendant.—A loose gown or wrapper and a head covering should be provided for the protection of the attendant's hair and clothing. These coverings should always be regarded as infected, and not sent out of the room until they have been soaked in disinfectant for an hour. They should then be boiled. The attendant should wear dresses of material not injured by disinfectants, as these should also be disinfected. On going out for fresh air and the like the attendant's garments should be completely changed. Gowns and head coverings should also be provided for the attending physician. These are kept outside the room. Immediately after use they are soaked in disinfectant for an hour and then boiled for one-half hour in soapsuds.

It is advisable that the attendant use an antiseptic mouth wash regularly. A good wash for this purpose is made by mixing 1 ounce of hydrogen peroxid in a glass of water and adding 10 or 15 drops of a 10 per cent alcoholic solution of thymol.

Ventilating and cleansing the room.—There is little tendency to "catch cold" in scarlet fever. The bedclothes should be light and the room aired thoroughly several times a day.

A room temperature of about 65° is suitable. No sweeping should be done, but the floor and furniture are to be frequently wiped with cloths dampened in disinfectant solution. After use the cloths should be soaked in disinfectant solution.

Screening against flies.—When flies are prevalent they should be kept away from the patient by the careful screening of all openings. Any flies which gain access to the sick-room should be killed.

Bath after recovery.—After recovery the patient's entire body, including the hair, should be bathed in warm soapsuds. The patient should then be removed from the room and dressed in clean clothes which have not been in the room during the sickness.

Subsequent cleansing and disinfection of the sick room.—The cleansing and disinfection of the sick room after recovery from scarlet fever will, in cities, be governed by the regulations of the local health office. When, however, the householder must follow his own initiative in the matter, the following measures should be carried out:

The room should be disinfected by formaldehyde gas in the following way:

Disinfection by formaldehyde gas.—All cracks in the windows, register, and stove-pipe openings and the like are to be closed by pasting strips of paper over them with starch paste. Everything in the room may be left in situ, but closets, drawers, and trunks are to be left open. The gas is generated by pouring formalin (40 per cent solution of formaldehyde gas in water) on permanganate of potash in 10-quart galvanized pails. The amount to be used depends upon circumstances, 10 ounces of formalin to 5 ounces of permanganate being a suitable allowance to each 1,000 cubic feet of air space, when the air is warm and moist, and double this quantity if it be cold and dry. In any event, no more than 10 ounces of the formalin and 5 ounces of the permanganate should be placed in a single 10-quart pail, as the evolution of the gas is very vigorous and attended with considerable sputtering. Each pail should be placed in a large tin pan in order to prevent damage from sputtering, and the pails evenly distributed over the room, allowing one or two pails to each 1,000 cubic feet, according to the atmospheric conditions.

Five ounces of the permanganate of potash are placed in each pail, and for each pail 10 ounces of the formalin is measured out in wide-mouthed vessels or cups and placed beside the pail in which it is to be used. Narrow-necked bottles should not be used, as the pouring will take too much time.

When everything is ready, start the generation of the gas by pouring the formalin on the permanganate of potash in each pail, proceeding as rapidly as possible and beginning with the pail farthest from the exit. The door is then rapidly closed and the keyhole and

door-cracks are pasted up with paper and starch paste, which should be in readiness outside the door.

The room should be kept closed for four hours. At the end of this time the doors and windows are opened and the gas is allowed to blow out. After the gaseous disinfection is completed, bed linen, garments, towels, and the like are disinfected in the manner previously described. The floors are flooded and scrubbed with hot disinfectant, the furniture is washed, and the walls are washed with the same as high as can be reached. Mattresses may be disinfected by steam; otherwise they should be burned. Books, toys, and similar objects used by the patient should be burned. The walls of the room should then be whitewashed or repapered, as the case may be.

In rural districts there may be some difficulty in getting the necessary chemicals for the above method of disinfection. In such cases the disinfection may be done by means of sulphur gas generated by burning sulphur in pots, according to the following method:

Pot method for disinfection by sulphur gas.—The materials needed for this method of disinfection are pots, sulphur, and a little alcohol.

For burning the sulphur a broad, shallow receptacle with a flat bottom 12 to 15 inches diameter and about 4 inches high is best. A dish pan answers the purpose very well.

Allow 5 pounds of sulphur to each 1,000 cubic feet of air space in the room.

After sealing all cracks with paper strips and paste in the manner previously described, begin by weighing out the amount of sulphur required by the cubic feet of air space of the room.

A sufficient number of pans should be available, so that the sulphur will form a layer in the bottom not over $1\frac{1}{2}$ to 2 inches deep. A crater-like depression is made in the center of the sulphur extending outward. If stick sulphur is used, it should be broken up and a portion pulverized.

Each sulphur pot should stand in a pan containing an inch or two of water, as the pot gets very hot. In addition to the protection from fire which this precaution gives, the heat from the pots evaporates the water and adds to the efficiency of the disinfection. If no pans for water are available the pots may stand upon earthen or metal surfaces and the disinfection will still be efficient if the air is sufficiently damp.

When everything is in readiness, start the disinfection by sprinkling the sulphur in each pot with alcohol. The alcohol in the pots should then be lighted. A convenient and safe method for doing this consists in striking a match and dropping it into the pot while the head is still burning. After the alcohol sets fire to the sulphur this will burn out of itself.

After lighting, the sulphur fumes do not begin to come off for several minutes, so the operator has an opportunity to see if all the pots are burning. As soon as all are seen to be properly lighted, the door of exit is closed and all its cracks are pasted up.

After the sulphur has been burning for half an hour a search should be made for cracks which have been overlooked. Such cracks are sealed.

The room should remain closed for 12 hours, after which the doors and windows may be opened, allowing the fumes to blow out. It is well to arrange the windows so that they may be opened from the outside, by using a ladder, otherwise it may be impossible to enter the room on account of the fumes. It should be borne in mind that sulphur fumes attack metals and are injurious to colored fabrics, furnishings, and the like, because of their bleaching properties. Hence the preference for formaldehyde gas for house disinfection, as the latter has no such injurious action.

Treatment of children who have been exposed to infection.—

When a case of scarlet fever occurs in a family, the other children have undoubtedly been exposed to infection. As has been previously stated, there is a good chance, though exposed, of their escaping the disease, especially if isolation of the sick has been prompt and thorough. It is therefore advisable to send such children away at once to friends or relatives not having small children of their own, taking the precaution to change their clothing completely before leaving. While there they should be carefully observed for symptoms of commencing scarlet fever for at least 10 or 12 days. If they are school children, they should be kept away from school.

Reporting the case.—An important step in the control of any communicable disease lies in the knowledge of its prevalence by the sanitary authorities. It is the public duty, therefore, of all citizens to report cases of scarlet fever to the local health officers and to have houses placarded where such cases exist.

It is likewise the householder's duty to observe scrupulously all regulations made by local health authorities in regard to the quarantine of scarlet-fever cases.

Other precautions to be observed.—As scarlet fever is capable of transmission through milk, it is important that all milk bottles used in houses where scarlet fever exists should be thoroughly disinfected by complete immersion in water, actually boiling, before being returned to the milkman. In no case should any member of the family coming in contact with the sick handle the bottles.

When a household in which there is a case of scarlet fever is engaged in any occupation having to do with the handling or distribution of food, such as the grocery business, dairying, the making of

ice cream, and the like, such business should be discontinued as long as the case of scarlet fever remains on the premises, or until the patient has been removed to a contagious-disease hospital, the premises thoroughly disinfected, and other members of the family observed for a sufficient length of time to assume their escape from the infection.

The public control of scarlet fever.—It is evident from the foregoing that the proper care of scarlet fever in the home is no easy problem even in the most intelligent and well-to-do families. Thorough isolation of the sick, in the tenement districts of cities, is well nigh impossible.

Under such conditions the control of the spread of scarlet fever must be in the hands of the local sanitary authorities. The most important equipments to this end are: First, adequate contagious-disease hospitals to which those suffering from scarlet fever may be removed, when it is clear, from an inspection of the premises, that cases of scarlet fever can not remain at home without danger of spreading the disease; second, an efficient corps of inspectors and nurses for the visiting and sanitary control of the cases of scarlet fever reported; and, third, an adequate system for the medical supervision of school children, so that cases of scarlet fever shall be early detected and the proper precautions taken before the infection has had a chance to spread among the scholars. Teachers also can aid greatly in the control of scarlet fever by being familiar with the symptoms attending its onset, encouraging their pupils to let them know whenever they feel sick, removing at once from the classroom any child having sore throat or seized with sudden vomiting, and reporting their action at once to the proper authorities. The school nurse and the school physician are indispensable agents in limiting the spread of scarlet fever in schools.

School authorities will materially contribute their share by abolishing in schools the common drinking cup, the common towel, the common lead pencil, which, though slowly vanishing, are still too frequently encountered in our schools.

General precautions against scarlet fever.—The body presents a natural resistance to contracting communicable diseases. We do not catch these diseases unless either the dose of the infecting germ has been sufficient or the natural resistance of the body has been temporarily reduced. Hence everything which tends to increase this resistance is of service in preventing a child from contracting scarlet fever. Attention to personal hygiene, the maintenance of a robust state of health by the use of suitable food, exercise, and fresh air, form serviceable general precautions for reducing the susceptibility to any communicable disease.

Attention has already been called to the mouth, nose, and throat as gateways of infection in scarlet fever. Certain diseased conditions of these regions of the body, such as defective teeth, enlarged tonsils, and adenoids, undoubtedly make them more vulnerable as gateways of infection. Care should be taken, therefore, early to correct such faulty mouth, nose, and throat conditions in children, for by so doing, not only do we strengthen a weak part of the body defenses, but we effect thereby a notable improvement in the general health, besides removing conditions known to exert an unfortunate influence upon the subsequent physical or even the mental development.

While it is realized that it is instinctive for the child habitually to carry all objects to the mouth, it is well worth while, on the part of parents and guardians, to teach children, as early as possible, that the only substances which naturally belong in the mouth are food and drink. The danger of such practices as putting lead pencils, coins, and similar objects in the mouth, the use of the common towel and drinking cup, taking bites of the same apple or stick of candy, the failure to turn the head away when coughing or sneezing, and, in a word, all acts which lead to an exchange of the mouth fluids between human beings should be regarded as one of the earliest and most practical essentials of the education of children.

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RUPERT BLUE, SURGEON GENERAL

SUPPLEMENT NO. 22 TO THE PUBLIC HEALTH REPORTS, JUNE 18, 1915.

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**RESOLUTIONS CONCERNING DISPOSAL OF HUMAN
EXCRETA AT UNSEWERED HOMES.**

The following resolution was adopted by the Thirteenth Annual Conference of State and Territorial Health Authorities with the United States Public Health Service held in Washington May 13, 1915:

Whereas much preventable disease in the United States results from insanitary disposal of human excreta in our rural districts: Therefore be it

Resolved, (1) That the promotion of improved methods of disposal of human excreta at unsewered homes is one of the most important duties of municipal, county, State, and National health officials.

(2) That the only disposal methods to be recommended are those that prevent the conveyance—by water, foods, fingers, flies, or other agencies—of human excreta to human mouths.

(3) That human excreta not previously treated so as to be rendered free from all living pathogenic agents likely to be contained in such matter should not be deposited in the ground at any place near, and certainly not less than 200 feet from, any source of water supply used by persons for drinking or culinary purposes or for washing foods or food containers.

(4) That the places used for the disposal of human excreta in the ground should, wherever practicable, be downhill and never uphill from dwellings and from sources of water supply.

(5) That at every place of human abode, and also at schools and churches, either sanitary water-closets or sanitary privies should be provided, and these should be used in a cleanly manner.

(6) That in advocating privies for use in the disposal of human excreta not only proper construction but also proper upkeep and proper use of the same and proper disposal of contents should be urged.

(7) That in general the only types of privy to be recommended as sanitary are those provided with water-tight receptacles to receive the excreta, and so constructed that flies can not have access to the excreta.

(8) That the construction and use of privies such as fly-proof surface privies, unscreened receptacle privies, and the so-called "pit privies," which

may be improvements over existing privies in certain localities, but which can be made to serve the purpose of sanitary privies only under certain conditions of location, season, and soil formation, should be suggested only as compromises and with a full presentation of their attendant dangers.

(9) That the so-called "pit privies" are especially unsuited for use in sections having limestone or marshy soil formation.

(10) That in recommending an installation or a modification of privies the principles of sanitary disposal of human excreta should be emphasized.

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